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Tetanus

Overview

For a more complete overview of Tetanus, refer to the following texts:

- Control of Communicable Diseases Manual (CCDM)
- Red Book, Report of the Committee on Infectious Diseases.
- “Pink Book”, Epidemiology and Prevention of Vaccine-Preventable Diseases
- Manual for the Surveillance of Vaccine-Preventable Disease

Case Definition⁽⁴⁾

Clinical description

Tetanus is an acute, often fatal disease that is characterized by generalized increased rigidity and convulsive spasms of skeletal muscles. Tetanus is caused by the spore-forming bacterium *Clostridium tetani*. *C. tetani* spores (the dormant form of the organism) are found in soil and in animal and human feces. The spores enter the body through breaks in the skin, and germinate under low oxygen conditions. Puncture wounds and wounds with a significant amount of tissue injury are more likely to promote germination. The vegetative organisms excrete the potent toxin tetanospasmin into the bloodstream. The toxin then reaches the nervous system, causing painful and often violent muscular contractions. The muscle stiffness usually first involves the jaw (lockjaw) and neck, and later becomes generalized. Tetanus is a noncommunicable disease- it is not transmitted from one person to another.


Laboratory criteria for diagnosis

There are no laboratory findings characteristic of tetanus. The diagnosis is entirely clinical. *C. tetani* is recovered from wounds in only 30% of cases, and, not infrequently, the organism is isolated from patients who do not have tetanus. Serology obtained before TIG is administered can support susceptibility if the result demonstrates very low or undetectable anti-tetanus antibody levels. However, tetanus can occur in the presence of “protective” levels of antitoxin (> 0.1 IU by standard ELISA); therefore, serology can never exclude the diagnosis of tetanus.

Case classification

Tetanus clinical case definition: Tetanus is defined by the acute onset of hypertonia or by painful muscular contractions (usually the muscles of the jaw and neck) and generalized muscle spasms without other apparent medical cause.

Confirmed: A clinically compatible case, as reported by a health-care professional.

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Comment

Outbreaks of tetanus among injecting drug users have occurred⁽⁴⁾. An increase in the number of cases among injecting-drug users in California has been noted since the early 1990s⁽⁴⁾.

Information Needed for Investigation

Verify clinical diagnosis. What laboratory tests were conducted? What were the results? What are the patient's clinical symptoms?

Establish the extent of illness. Does the illness meet the case definition? Is the patient properly vaccinated?

Contact the Regional Communicable Disease Coordinator assigned to your county.

Complete the Tetanus Report 580-0814 (IMMP-45).


Case/Contact Follow-Up And Control Measures

The following action should also be taken for any tetanus cases detected.

- Contact the Regional Communicable Disease Coordinator assigned to your county.
- Obtain appropriate preliminary clinical and epidemiological information including vaccine history.
- Treatment with Tetanus Immune Globulin (human) (TIG) is recommended. A single total dose of 3000 to 6000 U is recommended for children and adults.
- Immune Globulin Intravenous contains antibodies to tetanus and can be considered for treatment if TIG is not available. Approval by the US Food and Drug Administration has not been given for this use, and the dosage has not been determined.
- All wounds should be properly cleaned and débrided, especially if extensive necrosis is present. In neonatal tetanus, wide excision of the umbilical stump is not indicated.
- Supportive care and pharmacotherapy to control tetanic spasms are of major importance.
- Oral(or intravenous) metronidazole (30me/kg per day, given at 6-hour intervals) is effective in reducing the number of vegetative forms of *C tetani* and is the antibiotic of choice. Parenteral penicillin G (100,000 U/kg per day, given at 4- to 6-hour intervals) is an alternative treatment. Therapy for 10 to 14 days is recommended.

Control Measures⁽²⁾

- The use of tetanus toxoid and TIG or antitoxin in the management of wounds depends on the nature of the wound and the history of immunization with tetanus toxoid.
- Any open wound can be a potential source of tetanus, those contaminated with dirt, feces, soil, or saliva are at an increased risk. Wounds containing devitalized tissue, including necrotic or gangrenous wounds, frostbite, crush and avulsion injuries, and burns are particularly prone to contamination with *C tetani*.
- If tetanus immunization is incomplete at the time of wound treatment, a dose of vaccine should be given, and the immunization series should be completed


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according to the primary immunization schedule. Tetanus Immune Globulin should be administered for tetanus-prone wounds in patients infected with human immunodeficiency virus, regardless of the history of tetanus immunizations.

- In usual practice, when tetanus toxoid is required for wound prophylaxis in a child 7 years of age or older, the use of adult-type diphtheria and tetanus toxoids (dT) instead of tetanus toxoid alone is advisable so that diphtheria immunity also is maintained. When a booster injection is indicated for wound prophylaxis in a child younger than 7 years of age, diphtheria and tetanus toxoid and acellular pertussis vaccine (DTaP) should be used unless pertussis vaccine is contraindicated, in which case immunization with diphtheria and tetanus toxoids (DT) is recommended.
- When TIG is required for wound prophylaxis, it is given intramuscularly in a dose of 250 U. Equine tetanus antitoxin is recommended if TIG is unavailable; the dose is 3000 to 5000 U intramuscularly, after appropriate testing of the patient for sensitivity. (Refer to Red Book for Sensitivity Tests for Reactions to Animal Sera.) If tetanus toxoid and TIG or equine tetanus antitoxin are given concurrently, separate syringes and sites should be used. Administration of TIG or equine tetanus antitoxin does not preclude initiation of active immunization with tetanus toxoid. Efforts should be made to initiate immunization and arrange for its completion.
- Regardless of immunization status, dirty wounds should be properly cleaned and débrided if dirt or necrotic tissue is present. Wounds should receive prompt surgical treatment to remove all devitalized tissue and foreign material as an essential part of tetanus prophylaxis. It is not necessary or appropriate to extensively débrided puncture wounds.

ACIP-Recommended Routine Vaccination Schedule^(2,3)

Vaccine	2 Months	4 Months	6 Months	15-18 Months	4 – 6 Years	11 – 18 Years
Diphtheria, Tetanus, Pertussis	Dose 1	Dose 2	Dose 3	Dose 4	Booster	--
DTaP- Hib	--	--	--	Dose 4	--	--
DTaP, Hepatitis B, Polio	Dose 1	Dose 2	Dose 3	--	--	--
Td	--	--	--	--	--	Booster

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Refer to the Epidemiology and Prevention of Vaccine-Preventable Diseases (Pink Book) Table 1. Catch-up schedule for children age 4 months through 6 years, and Table 2. Catch-up schedule for children age 7 through 18 years, for children who are un-immunized or behind on immunizations.

Tetanus and diphtheria toxoids (Td) is recommended at age 11-12 years of age if at least 5 years have elapsed since the last dose of tetanus and diphtheria toxoid-containing vaccine. Td boosters are recommended every 10 years.

Contraindications and precautions to vaccination:-^(2,3)

A severe allergic reaction (acute respiratory distress or collapse) following a previous dose of tetanus toxoid is a contraindication to receipt of tetanus toxoid. If a generalized reaction is suspected to represent allergy, it may be useful to refer an individual for appropriate skin testing before discontinuing tetanus toxoid immunization.

A moderate or severe acute illness is reason to defer routine vaccination, but minor illness is not.


Laboratory Procedures⁽³⁾

There are no laboratory findings characteristic of tetanus. The diagnosis is entirely clinical and does not depend upon bacteriologic confirmation. *C. tetani* is recovered from the wound in only 30% of cases, and can be isolated from patients who do not have tetanus. Laboratory identification of the organism depends most importantly on the demonstration of toxin production in mice.

Reporting Requirements

Tetanus is a Category II disease and shall be reported to the local health authority or to the DHSS within three (3) days of first knowledge or suspicion by telephone, facsimile or other rapid communication.

1. For confirmed and probable cases complete a "Disease Case Report" (CD-1), and a Tetanus Report (ImmP-45) revised 9-02.
2. Entry of the complete CD-1 into the MOHSIS database negates the need for the paper CD-1 to be forwarded to the Regional Health Office.
3. Send the completed secondary investigation form to the Regional Health Office.
4. All outbreaks or "suspected" outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the Regional Communicable Disease Coordinator. This can be accomplished by completing the Missouri Outbreak Surveillance Report (CD-51).
5. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the Regional Communicable Disease Coordinator.

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References

1. Chin, James, ed. "Tetanus", Control of Communicable Diseases Manual, 17th edition. Washington, D.C.: American Public Health Association. 2000: 491-496.
2. American Academy of Pediatrics, "Tetanus". In: Pickering LK ed. Red Book: 2003 Report of the Committee on Infectious Diseases. 26th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2003, 611-616.
3. Atkinson, William & Wolfe, Charles, ed. "Tetanus" Epidemiology and Prevention of Vaccine-Preventable Diseases 7th ed. Centers for Disease Control and Prevention 2002. 49-57.
4. Tippavan Nagachinta, MD, DrPH; Margaret Mary Cortese, MD; Marty H Roper, MD, MPH; F. Brian Pascual, MPH; Trudy Murphy, "Tetanus" Wharton, Melinda, & Roush, Sandra, ed. Manual for the Surveillance of Vaccine-Preventable Diseases 3rd ed. Centers for Disease Control and Prevention 2002 Ch. 13, 1-8.

Other Sources of Information

1. Centers for Disease Control, National Immunization Program <http://cdc.gov/nip/>
2. Immunization Action Coalition, <http://immunize.org/>
3. Missouri Department of Health and Senior Services, <http://dhss.state.mo.us/immunizations/index.html>

Tetanus

FACT SHEET

What is tetanus?

Tetanus is a bacterium that lives in the soil and can enter the body through a cut or a wound. The bacteria produce a poisonous substance, an exotoxin, which causes the clinical illness.

Who gets this disease?

Tetanus occurs almost exclusively in un-immunized or inadequately immunized persons.

How is it spread?

Unlike other vaccine-preventable diseases, tetanus is not spread from person-to-person. It occurs when the bacterium in soil or dust is introduced into the body through a wound.

What are the symptoms?

The poisonous exotoxin produced by the *Clostridium tetani* bacterium causes muscles to go into spasms. Paralysis and death can result. Sometime tetanus is referred to as “lock jaw”.

How can tetanus be prevented?

The Advisory Committee on Immunization Practices (ACIP) recommends immunizing children against tetanus-along with diphtheria and pertussis-beginning as early as six weeks of age. Children should receive five doses of diphtheria-tetanus-acellular pertussis (DTaP) vaccine. The first three doses are given on or near two, four, and six months of age. The fourth dose should be given between 15-18 months of age and the fifth dose at age 4-6 years. The first booster dose is recommended at age 11-12 years as long as at least five years have elapsed since the last dose of tetanus toxoid containing vaccine. Subsequent routine tetanus diphtheria (Td) boosters are recommended every 10 years.

Also, it is important to be sure that all cuts, scrapes and puncture wounds are cleaned well with soap and water.

Missouri Department of Health and Senior Services
Section for Communicable Disease Prevention
Phone: (866) 628-9891 or (573) 751-6113



MISSOURI DEPARTMENT OF HEALTH AND SENIOR SERVICES
OFFICE OF SURVEILLANCE

TETANUS REPORT

CASE NO.

PATIENT	NAME (LAST, FIRST, M.I.)			COUNTY
	ADDRESS	CITY	STATE	ZIP CODE
Reporting Physician Nurse/Hosp/ Clinic	NAME			TELEPHONE
	ADDRESS	CITY		ZIP CODE

DEMOGRAPHICS

BIRTHDATE (MONTH/DAY/YEAR)	RACE	ETHNICITY
SEX	<input type="checkbox"/> NATIVE AMER./ALASKAN NATIVE <input type="checkbox"/> ASIAN/PACIFIC ISLANDER <input type="checkbox"/> AFRICAN AMERICAN	<input type="checkbox"/> WHITE <input type="checkbox"/> OTHER <input type="checkbox"/> UNKNOWN
<input type="checkbox"/> MALE <input type="checkbox"/> FEMALE <input type="checkbox"/> UNKNOWN		<input type="checkbox"/> HISPANIC <input type="checkbox"/> NOT HISPANIC <input type="checkbox"/> UNKNOWN

HISTORY

HISTORY OF MILITARY/NATIONAL GUARD SERVICE <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN	YEAR OF TETANUS ONSET	YEAR OF ENTRY INTO MILITARY OR NATIONAL GUARD	OCCUPATION
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VACCINATION HISTORY

TETANUS TOXOID (TT) HISTORY PRIOR TO TETANUS DISEASE (EXCLUDE DOSES RECEIVED SINCE ACUTE INJURY)	YEARS SINCE LAST DOSE
<input type="checkbox"/> NEVER <input type="checkbox"/> 1 DOSE <input type="checkbox"/> 2 DOSES <input type="checkbox"/> 3 DOSES <input type="checkbox"/> 4+ DOSES <input type="checkbox"/> UNKNOWN	

CLINICAL DATA

ACUTE WOUND IDENTIFIED? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN	DATE WOUND OCCURRED (MONTH/DAY/YEAR)	WORK RELATED <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN
PRINCIPAL ANATOMIC SITE <input type="checkbox"/> HEAD <input type="checkbox"/> UPPER EXTREMITY <input type="checkbox"/> UNSPECIFIED <input type="checkbox"/> TRUNK <input type="checkbox"/> LOWER EXTREMITY	CIRCUMSTANCES (DESCRIBE IN DETAIL)	
ENVIRONMENT <input type="checkbox"/> HOME <input type="checkbox"/> FARM/YARD <input type="checkbox"/> OTHER OUTDOORS <input type="checkbox"/> OTHER INDOORS <input type="checkbox"/> AUTOMOBILE <input type="checkbox"/> UNKNOWN	WOUND CONTAMINATED? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN	
PRINCIPAL WOUND TYPE <input type="checkbox"/> PUNCTURE <input type="checkbox"/> LINEAR LACERATION <input type="checkbox"/> AVULSION <input type="checkbox"/> COMPOUND FRACTURE <input type="checkbox"/> STELLATE LACERATION <input type="checkbox"/> CRUSH <input type="checkbox"/> BURN <input type="checkbox"/> OTHER <input type="checkbox"/> ABRASION <input type="checkbox"/> FROSTBITE <input type="checkbox"/> UNKNOWN	SIGNS OF INFECTION? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN	
DEPTH OF WOUND <input type="checkbox"/> 1 CM. OR LESS <input type="checkbox"/> MORE THAN 1 CM. <input type="checkbox"/> UNKNOWN	DEVITALIZED, ISCHEMIC OR DENERVATED TISSUE PRESENT? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN	

MEDICAL CARE PRIOR TO ILLNESS ONSET

WAS MEDICAL CARE OBTAINED FOR THIS ACUTE INJURY? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN	
TETANUS TOXOID (TT) ADMINISTERED BEFORE TETANUS ONSET? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN	IF YES, TT GIVEN HOW SOON AFTER INJURY? <input type="checkbox"/> < 6 HRS <input type="checkbox"/> 1-4 DAYS <input type="checkbox"/> 10-14 DAYS <input type="checkbox"/> UNKNOWN <input type="checkbox"/> 7-23 HRS <input type="checkbox"/> 5-9 DAYS <input type="checkbox"/> 15+ DAYS
WOUND DEBRIDED BEFORE TETANUS ONSET? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN	IF YES, DEBRIDED HOW SOON AFTER INJURY? <input type="checkbox"/> < 6 HRS <input type="checkbox"/> 1-4 DAYS <input type="checkbox"/> 10-14 DAYS <input type="checkbox"/> UNKNOWN <input type="checkbox"/> 7-23 HRS <input type="checkbox"/> 5-9 DAYS <input type="checkbox"/> 15+ DAYS
TETANUS IMMUNE GLOBULIN (TIG) PROPHYLAXIS RECEIVED BEFORE TETANUS OFFSET <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN DOSAGE (IN UNITS) _____	IF YES, TIG GIVEN HOW SOON AFTER INJURY? <input type="checkbox"/> < 6 HRS <input type="checkbox"/> 1-4 DAYS <input type="checkbox"/> 10-14 DAYS <input type="checkbox"/> UNKNOWN <input type="checkbox"/> 7-23 HRS <input type="checkbox"/> 5-9 DAYS <input type="checkbox"/> 15+ DAYS
ASSOCIATED CONDITION (IF NO ACUTE INJURY) <input type="checkbox"/> ABSCESS <input type="checkbox"/> BLISTER <input type="checkbox"/> CELLULITIS <input type="checkbox"/> NONE <input type="checkbox"/> ULCER <input type="checkbox"/> GANGRENE <input type="checkbox"/> OTHER INFECTION	DESCRIBE CONDITION
DIABETES? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN	IF YES, INSULIN-DEPENDENT? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN
PARENTERAL DRUG ABUSE? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN	DESCRIBE

COURSE OF TETANUS DISEASE				
TYPE OF TETANUS DISEASE <input type="checkbox"/> GENERALIZED <input type="checkbox"/> LOCALIZED <input type="checkbox"/> CEPHALIC <input type="checkbox"/> UNKNOWN				
TIG THERAPY GIVEN? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN		TOTAL DOSAGE (IN UNITS)	IF YES, HOW SOON AFTER ILLNESS ONSET? <input type="checkbox"/> < 6 HRS <input type="checkbox"/> 1-4 DAYS <input type="checkbox"/> 10-14 DAYS <input type="checkbox"/> UNKNOWN <input type="checkbox"/> 7-23 HRS <input type="checkbox"/> 5-9 DAYS <input type="checkbox"/> 15+ DAYS	
DAYS HOSPITALIZED		DAYS IN ICU		DAYS RECEIVED MECHANICAL VENTILATION
OUTCOME ONE MONTH AFTER ONSET <input type="checkbox"/> RECOVERED <input type="checkbox"/> CONVALESCING <input type="checkbox"/> DIED			IF DIED, DATE EXPIRED (MONTH/DAY/YEAR)	
NEONATAL PATIENTS (UNDER 28 DAYS OLD)				
MOTHER'S AGE IN YEARS		MOTHER'S BIRTHDATE (MONTH/DAY/YEAR)		DATE MOTHER'S ARRIVAL IN U.S. (MONTH/DAY/YEAR)
MOTHER'S TETANUS TOXOID (TT) HISTORY PRIOR TO CHILD'S DISEASE (KNOWN DOSES ONLY) <input type="checkbox"/> NEVER <input type="checkbox"/> 2 DOSES <input type="checkbox"/> 4+ DOSES <input type="checkbox"/> 1 DOSE <input type="checkbox"/> 3 DOSES <input type="checkbox"/> UNKNOWN			YEARS SINCE MOTHER'S LAST TT DOSE	
CHILD'S BIRTHPLACE <input type="checkbox"/> HOSPITAL <input type="checkbox"/> HOME <input type="checkbox"/> OTHER <input type="checkbox"/> UNKNOWN				
BIRTH ATTENDANT(S) <input type="checkbox"/> PHYSICIAN <input type="checkbox"/> LICENSED MIDWIFE <input type="checkbox"/> OTHER <input type="checkbox"/> NURSE <input type="checkbox"/> UNLICENSED MIDWIFE <input type="checkbox"/> UNKNOWN			OTHER BIRTH ATTENDANT(S) (IF NOT PREVIOUSLY LISTED)	
ADDITIONAL COMMENTS				
<div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>				
NOTES				
Age		Age of patient at illness onset in no. of year, months, weeks, or days.		
Circumstances		For example, "stepped on a nail in basement."		
Contaminated wound		Contaminated with dirt, feces, soil, saliva, etc.		
Date mother's arrival in U.S.		If mother went out of the U.S. at any time during her pregnancy.		
DATE CASE FIRST REPORTED TO STATE MONTH DAY YEAR		FORM COMPLETED BY		TELEPHONE ()
				DATE FORM COMPLETED MONTH DAY YEAR